

# A Introduction to Hemp Production

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Industrial Hemp Production Workshop  
October 15, 2019  
Sterling, IL

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Commercial Agriculture  
NW IL

# Talking Points

- Taxonomy and Morphology
- Types of Hemp
- Hemp Production
- Hemp Processing and Applications
- Legislation/Registration



# Industrial Hemp Production August 2019

## Legend (count)

- Fiber & Seed (7)
- Fiber only (16)
- Seed only (23)
- CBD & Seed (48)
- CBD & Fiber (56)
- ▲ All 3 products (106)
- CBD only (575)

## Current Application Process Stats

21 Aug 19

Grower Apps Received 925

Grower Licenses Issued 601

Processor Apps Received 282

Processor Licenses Issued 146

Acres Approved 22,823.49

Acres Licensed 17,808.95



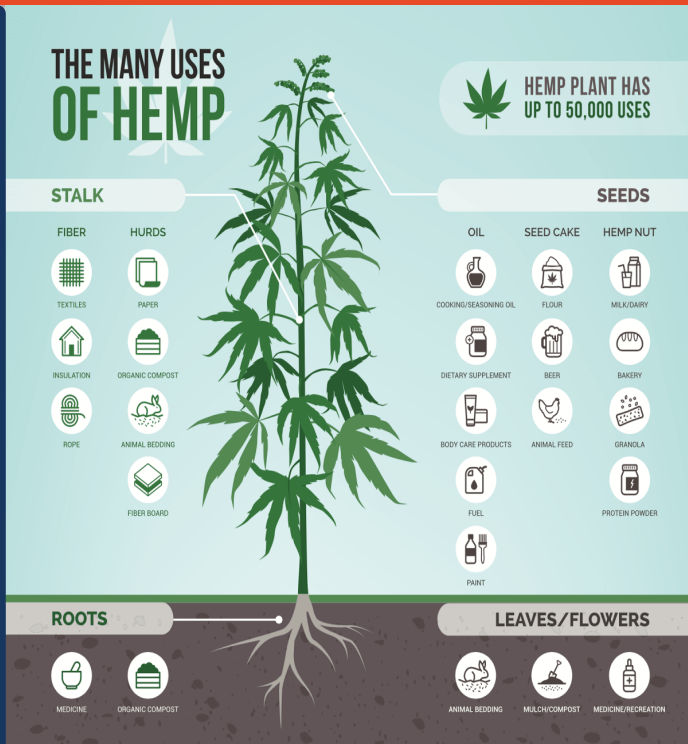
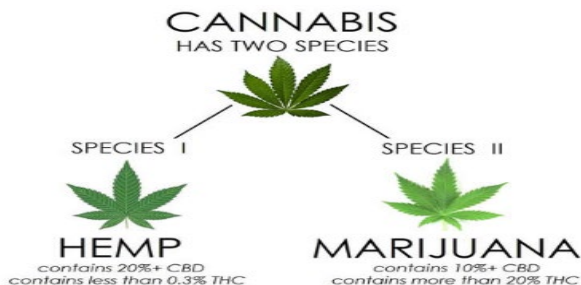
Arthur G. Cox, Bureau Chief  
Bureau of Medicinal Plants

Industrial Hemp in Illinois  
August, 2019



# Industrial Hemp

- *Cannabis sativa*
  - *Hemp vs Marijuana*
- Dicotyledonous Plant
- Primarily Dioecious
- Hemp is Photoperiod Dependent
  - Short-Day
  - 10-12 hours darkness





# Considerations

- **Soil Type:** Well-drained
  - **pH Range:** 6.0-7.5
  - **Soil Temperatures:** >50°F
  - **Planting Depth** 1/4- 3/4 in.
  - **Optimum Air Temperature:** 66-77°F
  - **Moisture Requirement:** >10-15 inches
  - **Plant AFTER** a rain, **NOT BEFORE**
- **Field Selection:**
    - Highly Productive
    - Low weed pressure
    - Well-drained
  - **Planting Rate:** Depends
  - **Planting Method:** Depends

# Considerations- Organic

- Rotations that provide naturally low weed pressure
  - Rotation after legume sod crops (Alfalfa, Clover)
    - Best weed control
    - Residual nitrogen
  - Rotation after Corn/Soybeans
    - High weed potential
    - Increased disease potential
- Possible use of Rotary Hoe, Tined-Weeder, Harrow, cultivator (rows)
- Increase planting rates

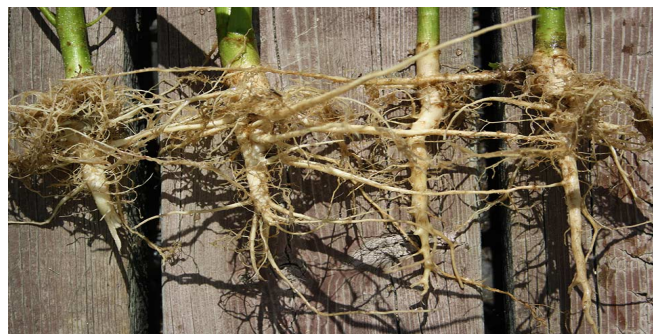
# Considerations

- Nutrient demand increases with plant age
- **Nitrogen:**
  - 100-125 lbs./acre (Grain)
  - 50 lbs/acre (Fiber)
- **Phosphorus:** 40-70 lbs./acre
- **Potassium:**
  - 60-100 lbs./acre (Grain)
  - 200+ lbs./acre (Fiber)
- **Sulfur:** 15-25 lbs./acre



# Growth Stages

- **Germination:** 24-48 hours
- **Emergence:** 4-10 days
- **Slow Growth:** Day 1-30
  - $\frac{1}{4}$  -  $\frac{1}{2}$  inch per day
- **Rapid Growth:** Day 30-60
  - 1-3 inches per day



<http://www.hemptrade.ca/eguide/background/the-hemp-plant>

# Pests: Weeds

- One of the most significant pests of hemp
- Field Selection is critical
- Find situations that reduces weed pressure
  - Use of soil amendments
- Weed control during first 30-Days is critical
- Possible mechanical control





# Growth Stages

## Reproductive Phase

- **Reproduction:** Day 60-90
- **Maturity:** Day 100-110
- **Harvest:** Day 110-130
  - September/October



Grain Field Nearing Flowering



Male Plant



Female Plant

# Pests: Disease and Insects

- Insects

- European Corn Borer
- Japanese Beetles
- Grasshoppers
- *Spider Mites*
- *Aphids*
- *Whiteflies*



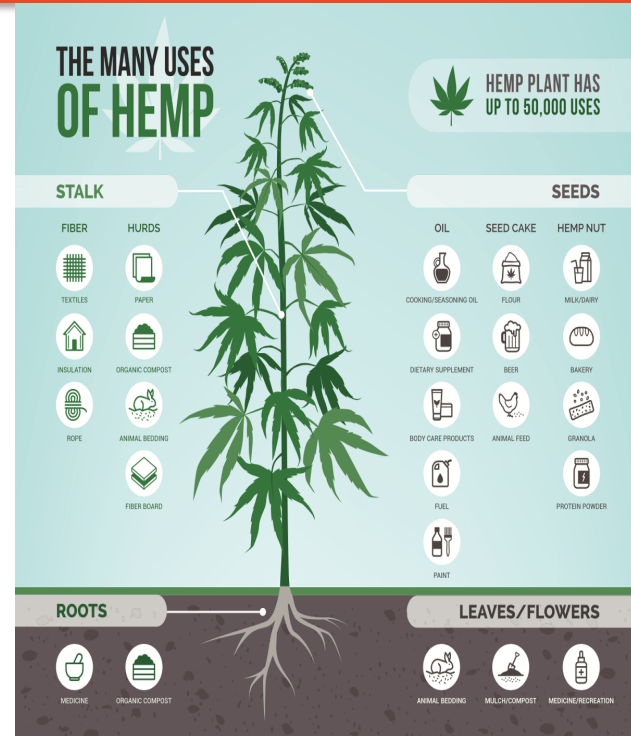
- Disease

- White Mold
- Gray Mold
- Septoria
- Powdery Mildew
- Downey Mildew



# Hemp Production Systems

- Grain
  - Small Grains (Wheat)
- Fiber
  - Forages (Hay)
- CBD
  - Specialty Crops (Tomatoes)





# Grain Hemp (Small Grains)

- **Planting Stock:** Seeds
- **Planting Method:** Grain Drill, Broadcast, Corn Planter
- **Planting Rate:** 25-35 lbs./acre
- **Harvest Method:** Combine
- **Post-Harvest:** Dry grain in aeration bins immediately



Maturing Grain Hemp Field



Combining Seed Heads

# Fiber Hemp (Hay/Forages)

- **Planting Stock:** Seeds
- **Planting Method:** Grain Drill, Broadcast
- **Planting Rate:** 50-70 lbs./acre
- **Harvest Method:** Mower, Baler
- **Post-Harvest:** Bales are stored at 15% moisture



Hemp Fiber Ready to Be Mowed Down



Hemp Fiber After Being Mowed

Photo Credit: Canadian Hemp Trade Alliance



June 14<sup>th</sup> - Stockton





July 3<sup>rd</sup>





July 23<sup>rd</sup>





July 29<sup>rd</sup>





July 29<sup>th</sup> – Aledo, IL



July 29<sup>th</sup>





August 16<sup>th</sup>



August 31<sup>st</sup>



# Grain Harvest

- 70-80% of seeds mature
- Maturation begins at the bottom of the head and continues upward
- Seed calyx/bracts will turn brown and shrink exposing seeds
- **Grain Harvest Moisture: 12-18%**
  - Handle Grain with Care
  - Quick Cleaning is recommended
  - Grain should be dried in aeration bins immediately
- **Storage moisture: 9%**



# Grading/Specification



Microbial Specification Standards	
Standard Plate Count	<100,000 cfu/g <sup>1</sup>
Total Coliforms	<1000 cfu/g
E. coli	Negative
Salmonella	Negative
Yeast & Mold (combined)	<1000 cfu/g
THC	<10 ppm <sup>2</sup>
Free Fatty Acid	<2%
Peroxide	<2meq/kg <sup>3</sup>
Gluten	<20 ppm

**Reminder:** Quality is the most important aspect of this crop.

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1 - cfu/g - colony forming unit per gram or the measure of viable bacterial or fungal cells.

2 - ppm - parts per million

3 - meq/kg - milliequivalents per kilogram

# Grain Hemp

- Hemp seeds are high in complete proteins and healthy saturated fats
- Hemp seed oil (NOT CBD) can be extracted
- Has potential to be used in both animal and human feed
- Storage of both seeds and oil to prevent spoilage is critical



# Fiber Hemp (Hay/Forages)

- **Harvest time:**

- **Mowing:** 1-3 days after combining
- **Bale:** 7-21 days after combining **Mow and bale in Spring**

- **Equipment**

- **Mower:** disk mower, sickle mower, swather
- **Baler:** large square baler, round baler



Hemp Fiber Ready to Be Mowed Down



Hemp Fiber After Being Mowed

Photo Credit: Canadian Hemp Trade Alliance

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Hemp Fiber After Being Mowed



Baled Hemp Fiber



# Fiber Hemp (Hay/Forages)

- Fiber (Bast) is the most valuable product from decorticated stalks
  - Textiles
- Hurd can be used in building materials, agricultural products, paper
- Pellets are absorbent and can be burned as biofuel



Fiber

Hurd

Dust Pellets





# Summary

- Field selection is important
  - Well drained soils
  - Highly productive, low weed pressure fields
  - Organic – Best to follow sod-forming legume
- Think of ways that promote rapid emergence and seedling growth
  - Good fertility
  - Good seedbed preparation
- Harvest grain heads only to reduce fiber wrapping
- Consider cleaning grain after combining
- Move grain to aeration bins immediately after harvest
- CBD Production is LABOR intensive

# General Provisions

- No person shall cultivate hemp in the state without an License
- No person shall process processor/handler registration
- All licensed persons in the state must provide “research” information
- Licensed cultivators are responsible for procuring seeds, clones, transplants or propagules for planting
- All seeds, clones, etc., shall be certified under the Association of Official Seed Certifying Agencies (AOSCA) standards and guidelines for industrial hemp OR contain a Certificate of Analysis (COA) which shows it tests below 0.3% THC threshold
- Licenses and registrations cannot be transferred or assigned, in whole or in part, to another business, individual or other entity

# Cherry Struck - Batch A

Plant, Flower - Cured



## Cannabinoids (SOP 801)

Analyte	LOQ	Mass	Mass	
	%	%	mg/g	
THCa	0.125	8.715	87.15	
Δ9-THC	0.125	0.433	4.33	
Δ8-THC	0.125	ND	ND	
THCVa	0.125	ND	ND	
THCV	0.125	ND	ND	
CBDa	0.125	16.144	161.44	
CBD	0.125	0.252	2.52	
CBDVa	0.125	ND	ND	
CBDV	0.125	ND	ND	
CBNa	0.125	ND	ND	
CBN	0.125	ND	ND	
CBGa	0.125	0.571	5.71	
CBG	0.125	ND	ND	
CBCa	0.125	ND	ND	
CBC	0.125	ND	ND	
CBL	0.125	ND	ND	
<b>Total</b>		<b>26.115</b>	<b>261.15</b>	

**8.076%**

Total THC

**14.411%**

Total CBD

**10.9%**

Moisture

# General Provisions – cont'd

- No land area may contain cannabis plants or parts of cannabis plants
- Minimum land area for cultivation shall be a contiguous land area of  $\frac{1}{4}$  of an acre for outdoor cultivation and 500 square feet for indoor.
- Each noncontiguous land area shall require a separate application fee
- Licensee info may be shared with law enforcement without notice
- Any violations by a licensee or registrant may be subject to administrative action

# Draft Rules

- Apply!
- Background Check – forms supplied by the IDOA
  - No person convicted of any felony, drug-related misdemeanor, or crime of dishonesty in the 10 years prior to the date of application shall be eligible for license/registration
- Within 30 Days, IDOA will either approve or deny application
  - If approved, submit license fee for each noncontiguous land area and each indoor cultivation operation
  - List varieties and acreage to be planted, along with COA
  - Any changes to the licensee's cultivation plan must be approved by the Dept.

# Draft application process -Cultivation

- Applicant must provide the following:
  - Name and address of the applicant;
  - Type of business or organization;
  - Business name and address (if different than information provided)
  - Legal description of land area, including GPS coordinates
  - A map of the land area on which you plan to grow hemp, showing boundaries and dimensions of growing area
  - The application fee of \$100
  - Registration fee
    - 1 year→ \$375
    - 2 year→ \$700
    - 3 year→ \$1000

# Draft process –Processor/handler

- Name and address of the registrant;
- Type of business;
- Business name and address (if different than information provided in (1));
- Nature of the processing or handling by the registrant;
- The applicable fee of \$100
- If approved, the registrant must pay \$1,000 registration fee for each registered address operated by a processor
- Registration fee
  - 1 year→ \$375
  - 2 year→ \$700
  - 3 year→ \$1000

# Research information

- Pre-Harvest Report – at least 30 days prior to harvest
  - Expected harvest dates and locations of each variety of industrial hemp
  - Notify Department if the harvest dates change in an excess of 5 days
- Final Report – no later than February 1 of each year
  - Total acres or square fee of industrial hemp planted
  - A description of each variety planted and harvested
  - Total acres or square feet harvested; and
  - Total yield in the appropriate measurement, such as tonnage, seeds/acres, etc. OR any other measurement approved by the IDOA



# Inspection and sampling

- All licensees are subject to inspection at the discretion of the IDOA
  - An “agent” must be present
- Dept. shall provide 5 business days’ notice to inspection
- A representative of sample MAY be taken by IDOA or approved laboratory personnel.
  - Producer is responsible for payment
- All plants are subject to sampling and testing to verify that delta-9 THC concentration does not exceed 0.3% on dry weight basis
  - Exceeding 0.3% and is not retested at the request of the licensee will be destroyed
  - Plant will be destroyed if retested and still “hot”
    - Methods for destroying crops have yet to be determined
- Must wait for results before processing and/or transportation of industrial hemp